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STATION B*

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Summary of Findings

Former Coal Gas Manufacturing Plants Michigan

prepared for

michcon

Michigan Consolidated Gas Company

July, 1985

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EDI ENGINEERING & SCIENCE
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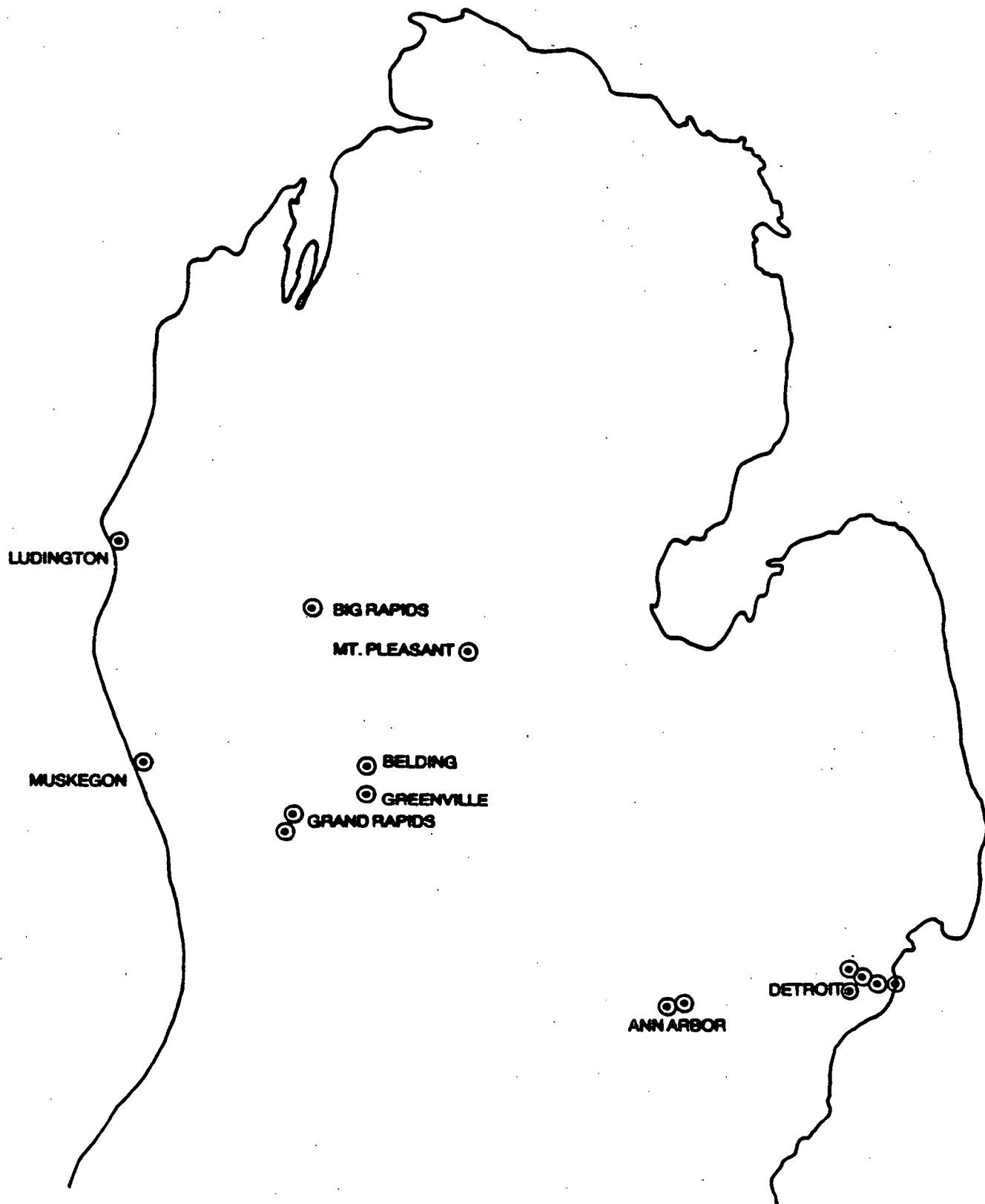
SUMMARY

An intensive investigation and analysis was conducted of the air, surface and subsurface soils and groundwater at various former Michigan Consolidated Coal Gas Manufacturing sites throughout the lower peninsula of Michigan. Figure 1 illustrates the location of the fifteen sites investigated. Human health hazards at the individual sites were evaluated by Dr. Jay Goodman, a certified toxicologist from Michigan State University.

For the most part, the evaluation of the data indicates the sites, in their present condition, pose no significant hazards to human health or the environment. In general, the data revealed that the ambient air at these sites did not contain detectable levels of various volatile organics that were found in subsurface soils. The surface soils contained chemicals associated with the coal gas manufacturing process (organic and inorganic compounds). The concentrations of these chemicals, however, were within the same general range (approximately a five to ten fold range) of what one would expect to find in "typical" surface soils and/or that which was detected in actual off-site surface soil samples. The absence of contaminants in the air and the extremely low levels of contaminants measured in the site surface soils demonstrate the lack of mobility of surface and subsurface chemicals found at these sites. The chemicals of concern in the subsurface soils are, for the most part, contained and not affecting surface soils or ambient air.

The data indicated that the groundwater under the sites contains chemicals associated with the coal gas manufacturing process. In the majority of cases, the groundwater contains chemicals of such concentrations that the water was unsuitable for use as a drinking water supply. However, according to all available information, the groundwater beneath and downgradient from the sites under investigation is not presently used as a drinking water source.

The analysis of the hydrogeology of the sites under investigation revealed that, in the majority of the sites studied, the groundwater below the sites was likely hydraulically connected to a nearby surface water body; i.e., a river or lake. The groundwater flow to these surface waters was variable due to the variable permeability of the subsurface soils and the various site specific recharge volumes of water. This raises the possibility that the inorganic and



Michigan Consolidated Gas Co.
**Former Coal Gas
Manufacturing Plant Sites
(Initial Investigation)**

Figure 1

organic substances detected in the groundwater under these sites has the potential of reaching nearby surface waters. For the most part, based upon dilution formula calculations, the concentrations of the substances released to the various surface waters is calculated to be below analytical detection limits at the outer edge of the assumed mixing zones. These evaluations examined both worst case and average case assumptions.

Additional studies are recommended at five sites. At Mt. Pleasant and Greenville, single surface soil sampling is recommended to verify initial presence of chromium and phenols, respectively. Groundwater sampling is recommended at Big Rapids to evaluate potential Mitchell Creek impacts and at Old Ann Arbor to establish groundwater flow direction and define hydraulic connection to Huron River. Investigation at Broadway requires additional information that could not be obtained at the time of report preparation due to high river flows.

Seven of the fifteen sites investigated indicated subsurface conditions comprised of moderate to low permeability fill soils underlain by relatively impermeable clays and clayey soils. The shallow depth, saturated thickness of subsurface soils, and low permeability precludes use of these saturated zones as a water supply. The remaining sites have subsurface conditions that have potential to be used as a drinking water supply. It is recommended at these sites that long-term safeguards against such use be investigated and implemented.

Future site development is anticipated at two of the sites; namely, Station B in Detroit and Wealthy Annex in Grand Rapids. While chemical concentrations in surface and subsurface soils do not preclude site development, recommendations and considerations are outlined for each of these sites.

A two-year monitoring program is recommended for all sites investigated, with the exception of Station J and Station H in Detroit. The monitoring program is recommended to confirm that conditions found at the time of analysis are persistent with time. The monitoring program includes a surface inspection at the time of sampling to determine if subsurface chemicals have had any visual impact on surface vegetation.

On-going remediation activities are currently proceeding at Riverside Park Station A to address concerns regarding spent oxide wastes in surface soils and shallow coal tar saturated soils.

For a detailed review of specific site related information concerning site description, data analysis, and conclusions, the individual initial investigation reports should be consulted. The findings presented in this report are based upon the data and conclusions presented in the individual site reports. A summary is found in Table 1.

The following section summarizes the findings for each of the sites investigated.

TABLE 1
SUMMARY OF
INDIVIDUAL MICHCON FORMER COAL GASIFICATION SITES

<u>Site Name</u>	<u>Additional Soil Samples</u>	<u>Additional Off-Site Groundwater Samples</u>	<u>Site Development Guidelines</u>	<u>Access Control</u>	<u>Additional Groundwater Investigation</u>	<u>Investigate Drainage Structures</u>	<u>Two-Year Monitoring Program</u>	<u>No Further Action</u>
Group 1:								
Riverside Park							X	
Station B			X				X	
River Rouge							X	
Station J								X
Station H								X
Wealthy Annex			X	X			X	
Wealthy Street							X	
Group 2:								
Belding					X		X	
Ludington					X		X	
Old Ann Arbor		X			X		X	
Broadway					X	X	X	
Mt. Pleasant	X				X		X	
Big Rapids		X			X		X	
Greenville	X				X		X	
Muskegon					X		X	

TABLE 1
SUMMARY OF
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Group 1:								
Riverside Park							X	
Station B			X				X	
River Rouge							X	
Station J								X
Station H								X
Wealthy Annex			X	X			X	
Wealthy Street							X	
Group 2:								
Belding					X		X	
Ludington					X		X	
Old Ann Arbor		X			X		X	
Broadway					X	X	X	
Mt. Pleasant	X				X		X	
Big Rapids		X			X		X	
Greenville	X				X		X	
Muskegon					X		X	

STATION B

In order to monitor any changes in the existing conditions present at the time of the preparation of the initial report and to ensure that the contaminants found on-site do not pose a significant concern to human health and the environment, the following represents a summary of significant findings and specific recommendations for this site. Individual reports contain more detailed information if required.

Specific Site Development Considerations

Any site development that necessitates subsoil excavation or surface soil restoration/revegetation activities would require special handling and analysis of soil and groundwater. In this regard, we recommend the following considerations.

General Soil Conditions:

The borings at the southern portion of Station B indicated 3.5 to 13 feet of fill materials above a sloping, natural, clay surface. Fill materials were comprised of primarily fine to medium sands but also included clays, gravels, concrete, cinders, bricks, wood, black oily material, and rubble. The clay surface below the fill slopes at a 1 to 3 percent grade towards the Detroit River. Groundwater which occurs approximately 3 to 6 feet below existing grade is likely influenced by the sloping, impermeable clay layer below.

Construction and Excavation:

Foundations for any proposed structures would likely extend to the underlying clay subsoils to develop support. This could be accomplished through excavation of subsurface fill soils or through the installation of piling or piers to transfer building loads to the underlying firm strata.

Disposal of excavated subsurface soils may require special consideration. It is not expected that all excavated material would have to be disposed of as hazardous waste; however, chemical analysis of soils in areas requiring excavation would be recommended to determine appropriate disposal methods or to segregate hazardous from non-hazardous soils.

At the time of actual site development, detailed soils investigation in areas of proposed structures would yield information for more specific recommendations concerning design and construction activities. It is recommended that site development activities be coordinated with Michigan Department of Natural Resources to insure compliance with existing regulations. Construction, excavation and material handling should follow proper health and safety precautions if dictated by chemical analysis.

Phytotoxicity:

Analysis of surface soils taken from the southern portion of Station B do not indicate levels of contaminants that would necessarily preclude plant growth. However, investigation by a British research team (Wilson & Stevens) revealed that chemicals from coal gasification sites, particularly oxide purifier wastes, may complex with nutrients in the soils, thus reducing the amount available for uptake by plants, and eventually cause phytotoxicity. Likewise, the presence of certain metals may be in sufficient concentrations or in readily available forms so as to cause toxic effects upon certain lawn grasses and selected species of ornamental shrubs or trees. A soil audit (nutrient availability and metal speciation) of surface soils to determine compatibility with proposed landscaping at the time of development would be recommended.

Surface Water Impact

The low concentration of the contaminants in the groundwater entering the Detroit River would not be found in excess of the analytical detection limits used in this investigation. This conclusion is based upon the use of a simple surface water discharge dilution formula. The results of the calculations from the formula suggest that the concentrations of the contaminants of concern at the outer edge of the hypothetical mixing zone would be very low and well below analytical detection limits. This is based upon using worst case and average case concentrations of the chemicals in the groundwater directly beneath and adjacent to the site. Concentrations of the chemicals analyzed would most likely be considerably lower at the river bank due to the attenuative capacity of the soil and simple dispersion. Consequently, the analysis is based upon conservative assumptions.

Groundwater

The site investigation at Station B has indicated the presence of a shallow saturated zone underlying much of the site. The saturated zone was encountered at depths ranging from approximately 4 to 10 feet below the land surface. The thickness of the saturated zone, using the natural clay as the base, ranges between 0 and 10 feet. Water service for this site is available from the City of Detroit Municipal Water Supply System. A review of readily available data indicates the water of this saturated zone is not presently used as a water supply for any individual, public, industrial or agricultural use. The potential yield of this saturated zone, discussed below, indicates that it could not provide water in sufficient quantity to serve individual use, let alone meet the requirements of a public, industrial, or agricultural use.

The permeability of the sediments in this saturated zone is relatively low. This is indicated by the relatively slow recovery of the water table following hand bailing. The observation wells were bailed dry during sampling, indicating very low potential yield. Since the wet well was bailed dry, even such a low yield could not be maintained. Thus there is no potential for the use of water from this saturated zone as a water supply well.

Additionally, the shallow depth and low saturated thickness of the saturated zone precludes the installation of a legal well for use as a domestic water supply. Act 399 of the Public Acts of 1976 requires that a minimum of 25 feet of casing be installed below existing grade. This would place the top of the screen a minimum of five feet into the underlying lacustrine clay.

Existing records indicate that the nearest water supply well, the Michigan Naval Armory Well, drilled in 1936, is located approximately 1,500 feet north of the site. The present condition and use of this well has not been determined. The formation which this well taps, however, is the Sylvania Sand. The formation was encountered at a depth of approximately 570 feet below grade, and the well was finished at a total depth of 790 feet. Two significant aquiclude layers isolate this aquifer and the shallow saturated zone, a 70 feet lacustrine clay layer and a 22 feet thick shale layer.

Proposed Monitoring Program

The long history of the site and its proximity to the Detroit River indicate that the movement of contaminants has likely reached a steady state condition. In order to verify this, quarterly monitoring for two years is proposed. This schedule would be modified if monitoring results indicate deteriorating discharge conditions based on the background data established in the initial report for the site and the quarterly monitoring results. If, at the end of two years, no significant changes have occurred with respect to contaminant levels or groundwater movement, we would recommend that monitoring be discontinued.

Each round of sampling would include determination of water levels in all water wells and collection of water samples from all of the existing monitoring wells. The sampling methodology would be the same as for the initial report. Water samples would be analyzed for the following parameters:

volatile aromatic hydrocarbons

benzene
toluene
ethyl benzene
xylene

polynuclear aromatic hydrocarbons

selected heavy metals

Cu
Pb
Hg
As
Zn
Cr
Se

cyanide (total and amenable to chlorination)

total phenols

pH

The analytical methods would be the same as those used for the initial report. The water levels would be used to determine if the general flow conditions presented in the initial report are persistent.

In addition to monitoring the groundwater quality and flow direction, a surface inspection would also be made quarterly in conjunction with the groundwater monitoring. The inspection would be completed to determine the existence of visual surface irregularities which may be connected to subsurface contaminants. A detailed report, summarizing the results of the monitoring program and surface inspection, would be prepared and submitted to Michigan Consolidated Gas Company.